Smartctl

Modern drives allows to monitor its current state via SMART attributes. These values provide information about various parameters of the hard disk and can provide information on the disk's remaining lifespan or on any possible errors. In addition, various SMART tests can be performed to determine any hardware problems on the disk. On Linux smart support is provided by the package smartctl (Smartmontools).

Installation

The Smartmontools can be installed on Ubuntu using the package sources:

```
sudo apt-get install smartmontools
```

To ensure the hard disk supports SMART and is enabled, use the following command (in this example for the hard disk /dev/sda):

```
sudo smartctl -i /dev/sda
smartctl 6.6 2017-11-05 r4594 [x86_64-linux-4.19.0-5-amd64] (local build)
Copyright (C) 2002-17, Bruce Allen, Christian Franke, www.smartmontools.org
=== START OF INFORMATION SECTION ===
Model Family:     Samsung based SSDs
Device Model:     Samsung SSD 850 PRO 1TB
Serial Number:    S252NWAG305759W
LU WWN Device Id: 5 002538 8700cd57e
Firmware Version: EXM02B6Q
User Capacity:    1,024,209,543,168 bytes [1,02 TB]
Sector Size:      512 bytes logical/physical
Rotation Rate:    Solid State Device
Device is:        In smartctl database [for details use: -P show]
ATA Version is:   ACS-2, ATA8-ACS T13/1699-D revision 4c
SATA Version is:  SATA 3.1, 6.0 Gb/s (current: 6.0 Gb/s)
Local Time is:    Sun Sep  1 10:11:27 2019 CEST
SMART support is: Available - device has SMART capability.
SMART support is: Enabled
```

Query Status

The status information of the drive can be queries with the following commands

```
  sudo smartctl -a /dev/sda              [Show all SMART information for
device]
  sudo smartctl -x /dev/sda              [Show all information for device]
```

Calculate Total Bytes Written

Smart attribute 241 (Total_LBAs_Written) can be used to derive the total bytes that have been written during the lifetime of the device.

```
sudo smartctl /dev/sda --all | grep Total_LBAs_Written
241 Total_LBAs_Written      0x0032   099   099   000    Old_age    Always
-       1479724000
```

The LBA consists of the sector size, which can be retrieved as follows:

```
sudo smartctl /dev/sda --all | grep "Sector Size"
Sector Size:       512 bytes logical/physical
```

Total bytes written during the lifetime of the device, can now be calculated:

```
Total LBA    1.479.724.000
Sector Size  512
Total Bytes  757.618.688.000
Total KB     739.862.000
Total MB     729.647
Total GB     720
```

ATA Tests

Short Test

Purpose is a rapid identification of a defective hard drive. Therefore, a maximum run time for the short test is 2 min. The test checks the disk by dividing it into three different segments. The following areas are tested:

- Electrical Properties: The controller tests its own electronics, and since this is specific to each manufacturer, it cannot be explained exactly what is being tested. It is conceivable, for example, to test the internal RAM, the read/write circuits or the head electronics.
- Mechanical Properties: The exact sequence of the servos and the positioning mechanism to be tested is also specific to each manufacturer.
- Read/Verify: It will read a certain area of the disk and verify certain data, the size and position of the region that is read is also specific to each manufacturer.

Long Test

The long test was designed as the final test in production and is the same as the short test with two differences. The first: there is no time restriction and in the Read/Verify segment the entire disk is checked and not just a section. The Long test can, for example, be used to confirm the results of the short tests.

Check available tests

Before performing a test, an approximate indication of the time duration of the various tests are displayed using the following command:

```
sudo smartctl -c /dev/sda

Example output:
[.....]
Short self-test routine
recommended polling time:        (   2) minutes.
Extended self-test routine
recommended polling time:        ( 543) minutes.
[.....]
```

Start a test

The following command starts the desired test (in Background Mode):

```
  sudo smartctl -t <short|long> /dev/sda
```

It is also possible to perform an Foreground (offline) Mode test. However, only the standard self test (Short Test) is performed. To perform the tests in Foreground (offline) Mode a "-C" must be added to the command.

```
  sudo smartctl -t <short|long> -C /dev/sda
```

```
Example output:
smartctl 5.41 2011-06-09 r3365 [x86_64-linux-3.5.0-39-generic] (local build)
Copyright (C) 2002-11 by Bruce Allen, http://smartmontools.sourceforge.net

=== START OF OFFLINE IMMEDIATE AND SELF-TEST SECTION ===
Sending command: "Execute SMART Short self-test routine immediately in off-
line mode".
Drive command "Execute SMART Short self-test routine immediately in off-line
mode" successful.
Testing has begun.
Please wait 2 minutes for test to complete.
Test will complete after Mon Sep  2 15:32:30 2013

Use smartctl -X to abort test.
```

View test results

In general, the test results are included in the output of the following commands:

```
sudo smartctl -a /dev/sda

Example:

[...]
SMART Self-test log structure revision number 1
Num  Test_Description      Status                    Remaining  LifeTime(hours)
LBA_of_first_error
# 1  Short offline         Completed without error      00%        2089
-
# 2  Extended offline      Completed without error      00%        2087
-
# 3  Short offline         Completed without error      00%        2084
-


SMART Selective self-test log data structure revision number 1
 SPAN   MIN_LBA  MAX_LBA  CURRENT_TEST_STATUS
    1         0        0  Not_testing
    2         0        0  Not_testing
    3         0        0  Not_testing
    4         0        0  Not_testing
    5         0        0  Not_testing
Selective self-test flags (0x0):
  After scanning selected spans, do NOT read-scan remainder of disk.
If Selective self-test is pending on power-up, resume after 0 minute delay.
[...]
```

The following command can also be used, if only the test results should are displayed:

```
sudo smartctl -l selftest /dev/sda

Example output:

smartctl 5.41 2011-06-09 r3365 [x86_64-linux-3.5.0-39-generic] (local build)
Copyright (C) 2002-11 by Bruce Allen, http://smartmontools.sourceforge.net

=== START OF READ SMART DATA SECTION ===
SMART Self-test log structure revision number 1
Num  Test_Description      Status                    Remaining  LifeTime(hours)
LBA_of_first_error
# 1  Short offline         Completed without error      00%        2089
-
# 2  Extended offline      Completed without error      00%        2087
-
# 3  Short offline         Completed without error      00%        2084
-
```

From:

<https://wiki.oscardegroot.nl/> - **HomeWiki**

Permanent link:

https://wiki.oscardegroot.nl/doku.php?id=linux:system:disk:smart

Last update: **2022/01/15 11:38**